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ABSTRACT

Gettysburg College (Pennsylvania) developed a program which centered on NCSA Mosaic as a vehicle for collaborative learning. The project involved a select number of incoming freshmen who lived together in the then-experimental residential college program. Goals included mastery of basic library and computer skills, gaining familiarity with Internet resources, and integration of technology into the classroom and residence hall experience. The final project was an electronic research paper on the World Wide Web, developed by class members, which linked their own personal research and writing with others in the group. (AEF)

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Mosaic as a Vehicle for Collaborative Learning

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Last fall Gettysburg College launched an exciting new program with first year students which centered on NCSA Mosaic as a vehicle for collaborative learning.¹ The pilot project involved a select number of incoming freshmen who lived together in the then-experimental residential college program. The project had several goals in mind from the start: mastery of basic library and computer skills, a familiarity with internet resources, a focus on technology, and an integration of this technology into the classroom and the residence hall experience. One of the pleasant discoveries was that using Mosaic as a technological centerpiece provided a marvelous opportunity for group work, collaborative learning and active learning. This paper will outline our initiative and describe the final project, an electronic "research paper" on the web, developed by class members, which linked their own personal research and writing with others in the group.

To put the project in context, Gettysburg College is a private, residential liberal arts college of 2,000 students located in rural, southcentral Pennsylvania. The College has a long history of supporting the use of computing and technology in the curriculum, beginning with the arrival in 1968 of an IBM 1130 computer that was used exclusively for academic purposes. The College now supports a multi-platform network. Campus networking was begun in 1991 and is 99% complete.

IBM (and compatibles) and Macintosh computers are equally represented on campus, along with some NeXT and Sun workstations. All faculty and administrative offices and nearly all student rooms have network connections. The College currently operates in a highly client-server environment and has developed local gopher, www, news and listserv servers, all of which are heavily used. While the College supports a number of public labs, students increasingly are coming to campus with their own personal computers.

In 1994 the computer center and library joined to form a new Information Resources Division (IR) under the direction of the former head of computing. As you might imagine, the merging of two distinct units, not to mention cultures, has not been without its stresses. The Mosaic project represented collaborative work on many fronts; it was one of the first initiatives of the new division. The project drew upon the expertise of librarians and computer professionals, working in conjunction with the faculty and staff of Student Life. It was a learning experience for everyone involved, and was an important early step in framing the service mission of the new division.

At the same time the Office of Student life was launching a program called residential college where a select number of freshmen would live together and take a class in common. In the fall of 1994,

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freshmen were offered the opportunity to choose an academic course that was organized with a residential component. The students in each academic section had a roommate from the same class and lived near each other in the residence hall. The dormitory was Hanson Hall and the Mosaic project was often referred to as the "Hanson Hall Project."

The residential college courses were seminars of sixteen students. Because of the small size, classes could be taught in the dorm, and offered participants the opportunity to converse and develop ideas in a more informal setting. Hanson Hall was networked and the seminar/study rooms were outfitted with several work stations.

The aim of residential college was to increase student participation in the intellectual and cultural life of the College by providing a challenging first year experience and fostering class identity. Collaboration had been a goal from the outset. Descriptive information issued on the program stressed the promotion of formal and informal interaction of students and faculty in supportive and educational ways. Special programming opportunities included a film series, guest speakers, field trips and weekly house dinners. Collaboration with the Information Resources division for library/electronic media workshops was a natural outgrowth of the program's mission.

The centerpiece of this paper is the work done in conjunction with one of these seminars, a course called Colloquy 100: Angles of Vision. The students enrolled in this interdisciplinary course were taught by Dr. Ann Fender, a senior member of the economics faculty who enjoyed delving outside her discipline and teaching a more humanities-based course occasionally. Angles of Vision explored questions of tyranny, violence, moral blindness, suffering and artistic creativity. Readings ranged from Darwin's classic, *On the Origin of the Species* and Alex Kotlowitz's gritty, urban tale *There Are No Children Here* to works of fiction including *A Handmaid's Tale* and *Frankenstein*. Through text, film and lecture the students looked at the struggle to overcome poverty, prejudice, hate and examined the forces of nature that give shape to individual destiny. The freshmen were asked to examine their convictions and see how viewing life from different angles might transform their understanding of self and society. So how does one get from human suffering and moral blindness to the world wide web?

All freshmen were required to attend a session early in the semester which introduced them to the campus network and electronic mail. Students in Hanson Hall were expected to attend two additional sessions dealing with technology. The idea was to go into greater detail on how to search the internet and to teach them the basics of html mark-up languages so they could create their own personal, electronic portfolio. The additional sessions were offered at night, in a large group setting in the training lab and turned out to be one of the less successful elements of the project.

Eight freshman residential classes were chosen to take part in the pilot. Each instructor was paired with one Information Resources professional to develop a technological component or assignment. The IR staff was free to take the project in any direction, although it was agreed upon that Mosaic would be the unifying technological piece of the puzzle.

For the unfamiliar, the World Wide Web (WWW) and its most popular browsers, Netscape and Mosaic, provide a way for users connected to a network to view work posted by others on the Internet. Material might include text, graphics, sound, and/or movies. It allows users to "publish" their own material for

distribution across both local and wide areanetworks. An author, for example, can publish a paper on a topic of choiceby storing it on a web server and making others aware of its accessaddress, known as a Universal Resource Locator or URL. The other usefulfeature of the web is that authors can link to each other's work by makingcertain words or phrases point to the appropriate URLs. These are know ashot spots. This technology seemed to fit well with Gettysburg'scampus-wide network and opened up new avenues to incorporate technology inthe classroom.

I was paired with Ann Fender's class. We developed the project "backwards"--brainstorming about what we wanted the final project to looklike and then working our way back to the beginning, defining the steps andcompetencies necessary to get there. The importance of the workingrelationship between the faculty member and IR staff member should not beunderestimated. Without a doubt it was the critical link in the projectssuccess or failure. When faculty were enthusiastic and eager to explorethe technological possibilities with their students the initiative was atits best. When faculty were luke-warm, technology-shy or unwilling toparticipate fully themselves the effort failed. Projects without strongfaculty commitment or without ongoing collaboration in both the projectplanning and implementation stage were not successful.

I was lucky to work with a member of the faculty who embraced thepossibilities and was anxious to learn all that she could. She knew whatresources she wanted her class to explore on the net. the InformationResources staff provided the structure, training and technical expertise toput it altogether. In our conversations, we developed a list of whatskills we wanted the students to master and what competencies we hoped theymight achieve. They included:

1. The ability to "surf the net", find databases, lists, discussiongroups and other information that was germane to the class theme.
2. The regular use of electronic-mail as an important means ofcommunication.
3. The use of technology as a way, not only to communicate aboutassignments, but to submit papers, comment on readings and critique worksof others.
4. The experience of working in a group collaboratively and developinga theme for group exploration.
5. The technical expertise to create a text document in Mosaic.
6. The technical expertise to create a link to an external database.
7. The ability to link to each other's work.
8. The technical expertise to scan an image and incorporate graphicsinto a mosaic document.
9. The development of good library-based and electronic-based researchskills.
10. Good writing

The students were assigned to working-groups of four. Theirassignment: choose a theme from the course and develop it with commentaryon relevant readings, great "finds" on the net, graphics, sound andpersonal reflection. Each member of the group was to contribute to theoverall project but develop some aspect of the theme on their own. Groupmembers were urged to establish links to each other's work, much like onewould footnote relevant sources in a research paper.

The course home page would include a course description, syllabus, home pages of class members, a group projects section and a reference guide (Illustration 1). The latter consisted of a descriptive guide of reference materials both electronic and print sources, in some cases with a link to the source itself. Professor Fender entered her biographical sketch along with information on personal and professional interests under the section entitled Class Members Home Pages and encouraged the class to do the same. She used her biographical sketch to demonstrate how one might create a link, making a hot spot for Canada in her text which led to the electronic version of the Encyclopaedia Britannica.

The students' first assignment was to "surf" the internet for materials related to the course. The difficulty arose when it came time to create a document and establish links. Despite the extra tutorial sessions, the students were uncertain about the mechanics of creating a document and generally unclear about the purpose of Mosaic. We met with great resistance. As a result, it seemed prudent to attempt a different training strategy. This time we did so by offering instruction in small groups where active-learning really could take place.²

Why were the large group sessions on Mosaic ineffective? Part of it was timing (mid semester). Part of it was the hour (evening). The lecture format and large group size (30) also contributed to the poor results. The training sessions were not project specific. Students from all eight residential college classes were mixed together. In many cases the faculty had not yet given them an assignment which accounted for the lack of perceived relevancy. The connections during the demonstration part of the training often failed and there was little time for actual "hands-on" practice despite the fact that each student had their own workstation.

By changing our teaching approach to a small, hands-on, active-learning environment we were able to succeed in our efforts to meet the initial goals. We changed the time to late afternoon, scheduling sessions at 4:00 and 5:00. We kept the sessions short (30 minutes) and limited the number of topics we'd try to cover at one sitting. Practical exercises included practice at creating a document, naming a file, moving a file, using the editor program and searching the internet. We could show them where their files actually resided on the College's network and how their work related to other's in the class. Students learned how to link one of their internet "finds" to their homepage while sitting with the instructor. We worked in groups of two or three in the instructor's office and offered a tri-fold with the basic html commands to carry away.

Of the sixteen students in Colloquy 100, half came in for one or more small group sessions. They, in turn, went back to Hansen Hall and worked with their classmates. At least one person in each project group developed the expertise to become the teachers themselves.

At the beginning we envisioned four large projects to which everyone would contribute. A drawback was that students would have to share usernames and passwords--something we wanted to avoid--or would have to designate one person as the official "enterer of text." We also wanted to avoid that scenario since the emphasis was to be on equal participation in a collaborative effort. This is where Mosaic proved to be the perfect vehicle.

Consulting with one another, the students arrived on a theme³, divided it into subtopics and decided on how to present it (Illustration 2). They wrote separately but could easily view each other's work in

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progress. They began to reference each other's work. For example, a student looking at nonconformism in literature made a link to a classmate's paper on nonconformist artists. The cross referencing also occurred outside the group. A student in the Minorities group wrote a paper on crime and urban poverty and linked to a classmate's project from the "Different Lenses" group, whose study was on children growing up in impoverished circumstances. The class went off in many original directions but with Mosaic software, joined themselves together as a unit.

Access to electronic mail allowed for easy dialog. I could look at their works-in-progress, test their links and troubleshoot difficulties. When something didn't work, I sent them e-mail. While my role was primarily technical consultant, I occasionally made a comment or two concerning content, for instance when a student wrote a lengthy piece on Nelson Mandela and labelled it "Famous African Americans."

The following project descriptions are particularly illustrative of the many possibilities that Mosaic offers for innovative class projects. Brad Wedermeyer explored values through the lens of a scientist. He used the film "Day After Trinity": the story of the making of the atom bomb, and the novel *Frankenstein* as the primary anchors for his project development. In addition to his writing he provided links to a database on the effects of radiation, the home page of the Nuclear Regulatory Commission, the full text of *Frankenstein* and reviews of the novel. He also made creative use of graphics including this example of a scanned image of a fallout shelter. His project ended with references and links to other members of the Different Lenses Group.

Alison Byrnes from the Nonconformism group centered her paper on Native Americans after reading *Lame Deer, Seeker of Visions*. She sought out materials related to the native American experience as evidenced in her links to documents as varied as the Iroquois Constitution and a database of Native American crafts. One of the most interesting aspects of her project was the work she did manipulating a scanned image. She included an image of her family tree, showing her descent from Cherokee and Choctaw Indians and was able to make a faded, hard-to-read, old typed copy of her family tree appear like a well-preserved family document.

Other students experimented with sound. Nicole Hunt wrote a paper on Maya Angelou, examining specifically her autobiographical work, *I Know Why the Caged Bird Sings*. She was able to locate the text of many of Angelou's poems on the net, including "On the Pulse of the Morning" a composition read at the Clinton Inaugural in 1993. She also incorporated sound into her project by establishing a link to a voice databank which included Maya Angelou reading aloud.

In a paper on homosexuality and discrimination Chris Killam established links to government documents, sources on AIDS and HIV, polls dealing with homosexuality and news stories on homophobia. Chris found the technology daunting at the beginning but attended the small group sessions and became so proficient that he earned the nickname "Doc" from his classmates and regularly held his own "clinic" in Hanson Hall to help the others.

A final project worth showing was created by Kalyani Fernando, who studied artists as nonconformists. She chose several artists and genres and began searching art museums all over the world. She impressed our trustees during a public presentation of the Hanson Hall Project, by bringing down a full color, larger

than life size image of Edvard Munch's "The Scream," demonstrating the power of Mosaic to deliver image as well as text effectively.

Beyond the projects themselves there were other success stories. One student had been feeling particularly alienated resisted doing anything that involved a computer, insisting that she was an "artiste", not a "computer nerd". We encouraged her to become the project photographer and she is responsible for most of the graphic images in the Hanson Hall Project. She learned to use the scanner, crop pictures, create a gif file and translate her photography into Mosaic illustrations. She now works for us in Information Resources as one of our resident computer nerds! Four other students from Colloquy 100 were hired by Residential Life to serve as Mosaic tutors for courses taught in the spring of 1995.

Those were a few of the personal outcomes. The Hanson Hall Project also has served as a useful planning device in the areas of budget, training, design and user education. Support is a very big issue--both in terms of personnel and finances. An initiative such as this is costly in terms of training time. While small group training may be superior to large instruction sessions, small groups are also more costly and labor intensive.

The solution was to move some of the training to the least expensive form of labor--student assistants--and establish drop-in clinics in the library. Students working on Mosaic projects could drop in, unscheduled, for help on any aspect of their project. This eliminated the burden on staff for very specific training and freed up Information Resources personnel to work with faculty to develop the conceptual side of mosaic projects. The drop-in clinics have been enormously successful. In some cases the student tutors became so familiar with particular class projects that they were able to make useful design and graphic recommendations to the staff overseeing the project.

Other costs occur in equipment. We needed a second scanner. We had to make sure that our lab computers were upgraded to handle the newest version of Mosaic, and later Netscape. The computers had to have the capacity to handle the sound, text and images that students were attempting to capture into their mosaic documents. We discovered a growing gap between what computer facilities accessible to students and the CPUs sitting on faculty desktops. Word about Mosaic travelled fast. The faculty, excited about the possibilities of this new technology, did not have adequate computers to search the internet efficiently, let alone embark on course related development with Mosaic. The need to replace faculty machines (and hardware in general) on a regular basis suddenly had much more immediacy when cast in the framework of what people could not do with their existing CPU. When it comes to equipment (or lack thereof) it is easy for a successful initiative to turn into a nightmare.

In fall 1995, we will conduct more training in the dormitories. Rooms have been set aside for Mosaic tutors and several students have been hired to provide that service to the next crop of residential college freshmen. We've also addressed the need to enable the faculty to a larger extent so that they are doing more of the architecture and design work themselves. This will mean more training for faculty. To this end, our Training Team is offering a web class this summer for interested faculty.

We've looked at group training with a different lens. While small group sessions are more effective they are often not practical. A group of Information Resources has begun discussions about dividing fall training of freshmen into more manageable thematic units, particularly where the teaching of the internet

is concerned. The Hanson Hall Project not only has challenged us to look at new ways of doing old things, it has also unearthed new, thorny, unresolved problems. Copyright compliance is an example. Does the incorporation of sound and graphics, the scanning of pictures from magazines and books constitute fair use and require simply a footnote indicating the source? Or does the electronic incorporation of the works of others constitute a copyright violation unless permission is sought and obtained? How do you footnote electronic information? Who will monitor this process?

In terms of infrastructure, how much Mosaic development can our system handle? Can our budgets accommodate the demand for training and equipment to support this technology? If the answer is no, how do we deal responsibly with limited resources but not discourage creative and intellectual development of this excellent teaching tool? Those questions do not have answers but they are part of our ongoing dialog, as we continue to explore ways to encourage collaborative learning in a changing technological environment.

¹Collaborative learning is the notion that students become accountable for their individual effort as well as a group product. Social skills and peer coaching are important outcomes of collaborative learning strategies. For an excellent account of collaborative learning in the information technology environment see Marjorie Warmkessel and Frances Carothers, "Collaborative Learning and Bibliographic Instruction," *Journal of Academic Librarianship*, 19 (March 1993):4-7.

²See Paula N. Warnken and Victoria L. Young, "Application of Training Principles and Techniques for Successful Library Instruction," *Reference Services Review* (Winter 1991):93-4 for a discussion of the importance of maintaining student's active involvement in the learning process as a learning and motivational technique.

³The themes included Nonconformism, Minority Groups, Individual Destiny and developing Different Lenses to view life experience.